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DEFENSE ACQUISITIONS

Improved Business Case Key for Future Combat System's Success

Statement of Paul L. Francis, Director,
Acquisition and Sourcing Management



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Highlights of [GAO-06-564T](#), a testimony before the Subcommittee on Tactical Air and Land Forces, Committee on Armed Services, House of Representatives

Why GAO Did This Study

The Future Combat System (FCS) is a networked family of weapons and other systems in the forefront of efforts by the Army to become a lighter, more agile, and more capable combat force. When considering complementary programs, projected investment costs for FCS are estimated to be on the order of \$200 billion.

FCS's cost is of concern given that developing and producing new weapon systems is among the largest investments the government makes, and FCS adds significantly to that total. Over the last 5 years, the Department of Defense (DOD) doubled its planned investments in such systems from \$700 billion in 2001 to \$1.4 trillion in 2006. At the same time, research and development costs on new weapons continue to grow on the order of 30 to 40 percent.

FCS will be competing for significant funds at a time when federal fiscal imbalances are exerting great pressures on discretionary spending. In the absence of more money being available, FCS and other programs must be executable within projected resources.

Today, I would like to discuss (1) the business case needed for FCS to be successful and (2) our recent recommendations to DOD and matters for congressional consideration regarding the FCS program.

www.gao.gov/cgi-bin/getrpt?GAO-06-564T.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Paul Francis at (202) 512-2811 or francisp@gao.gov.

DEFENSE ACQUISITIONS

Improved Business Case Key for Future Combat System's Success

What GAO Found

There are a number of compelling aspects of the FCS program, and it is hard to argue with the program's goals. However, the elements of a sound business case for such an acquisition program—firm requirements, mature technologies, a knowledge-based acquisition strategy, a realistic cost estimate, and sufficient funding—are not yet present. FCS began product development prematurely in 2003. Since then, the Army has made several changes to improve its approach for acquiring FCS. Yet today, the program remains a long way from having the level of knowledge it should have had before starting product development. FCS has all the markers for risks that would be difficult to accept for any single system, much less a complex, multiprogram effort. These challenges are even more daunting in the case of FCS not only because there are so many of them but because FCS represents a new concept of operations that is predicated on technological breakthroughs. Thus, technical problems, which accompany immaturity, not only pose traditional risks to cost, schedule, and performance; they pose risks to the new fighting concepts envisioned by the Army.

Last month, we made recommendations to the Secretary of Defense to take several actions, prior to DOD's long-term commitment to the program, to improve the FCS business case and establish knowledge-based measures to guide oversight of FCS progress. These recommendations detailed specific steps DOD should take leading up to a major milestone review of the program in 2008 when the program is expected to have achieved the level of knowledge it should have had in 2003. We believe it is at this point the program should be reviewed as to whether it has established enough of a solid business case to continue. While DOD concurred with the intent of our recommendations, it did not agree to limit its commitment to the FCS program or to do much beyond what it had already planned to do. This concerns us. As a result, we have also raised to Congress several matters for consideration to ensure that FCS has a sound business case before future funding commitments are made. We believe the actions we have recommended to DOD and the matters for consideration we have presented to Congress are necessary to improve the prospects for FCS success and to protect the government's ability to change course if the program does not progress as the Army plans.

Mr. Chairman and Members of the Subcommittee:

I am pleased to be here today to discuss the Department of the Army's Future Combat System (FCS), a networked family of weapons and other systems. FCS is in the forefront of efforts to help the Army transform itself into a lighter, more agile, and more capable combat force by using a new concept of operations, new technologies, and a new information network linking whole brigades together. This is a tremendous undertaking that will involve a total investment cost on the order of \$200 billion.

The context within which the FCS investment is being made is important. Fiscal imbalances faced by the federal government will continue to constrain discretionary spending. One of the single largest investments the government makes is the development and production of new weapon systems. Over the last 5 years, the Department of Defense (DOD) has doubled its planned investments in new weapon systems from about \$700 billion in 2001 to nearly \$1.4 trillion in 2006. At the same time, research and development cost growth on new weapons maintains its historical level of about 30 to 40 percent. This is the lens that must be used to look at major new investments, such as FCS, because more money may not be an option for the future. Rather, the key to getting better outcomes is to make individual programs more executable.

My statement today is based on our recently issued report about the need for an improved business case for the FCS. This report responds to the National Defense Authorization Act for Fiscal Year 2006, which requires GAO to report annually on the product development phase of the FCS's acquisition.¹ Recently, we testified before the Senate Armed Services Committee about the FCS's business case and related business arrangements.²

Today, I would like to discuss (1) the scope of the business case that we feel is necessary for the FCS to be successful and (2) our recent recommendations to DOD and matters for congressional consideration regarding the FCS program.

¹ GAO, *Defense Acquisitions: Improved Business Case Is Needed for Future Combat System's Successful Outcome*. [GAO-06-367](#). (Washington, D.C.: Mar. 14, 2006).

² GAO, *Defense Acquisitions: Business Case and Business Arrangements Key for Future Combat System's Success*. [GAO-06-478T](#). (Washington, D.C.: Mar. 1, 2006).

Summary

The critical role played by U.S. ground combat forces is underscored today in Operation Iraqi Freedom. That the Army should ensure its forces are well equipped with the capabilities they will need in the coming years is unquestioned. Moreover, the top-level goals the Army has set for its future force seem inarguable: to be as lethal and survivable as the current force, but significantly more sustainable and mobile. However, the Army's approach to meeting these needs—embodied in the FCS and its complementary systems—does raise questions.

On the one hand, the FCS is the result of the Army leadership's taking a hard look at how it wants its forces to fight in the future. Army leadership has had the courage to break with tradition on FCS; it would have likely been much easier to win support for successor vehicles to the Abrams and Bradley. On the other hand, FCS does not present a good business case for an acquisition program. It is necessary that a major new investment like FCS have a compelling, well thought-out concept, but this alone is not sufficient. FCS began product development prematurely in 2003, and today is a long way from having the level of knowledge it should have had before committing the high level of resources associated with a new product development effort. The elements of a sound business case—firm requirements, mature technologies, a knowledge-based acquisition strategy, a realistic cost estimate, and sufficient funding—are not yet present. FCS has all the markers for risks that would be difficult to accept for any single system. They are even more daunting in the case of FCS, not only because of their multiplicity, but because FCS represents a new concept of operations predicated on technological breakthroughs. Thus, technical problems, which accompany immaturity, not only pose traditional risks to cost, schedule, and performance, but also pose risks to the new fighting concepts envisioned by the Army.

A full commitment to the Army's strategy for acquiring FCS is not yet warranted because the Army has not demonstrated sufficient knowledge by providing the confidence it can deliver a fully capable FCS within projected costs and time frames. As DOD proceeds with its decisions, it must preserve its ability to change course on acquiring FCS capabilities to guard against a situation in which FCS will have to be acquired at any cost. It must also be able to hold the Army accountable for delivering FCS within budgeted resources. Last month, we made recommendations to the Secretary of Defense to take several actions, prior to DOD's long-term commitment to the program, to improve the FCS business case and establish knowledge-based measures to guide oversight of FCS progress. These recommendations detailed specific steps DOD should take leading up to a major milestone review of the program in 2008, when the program

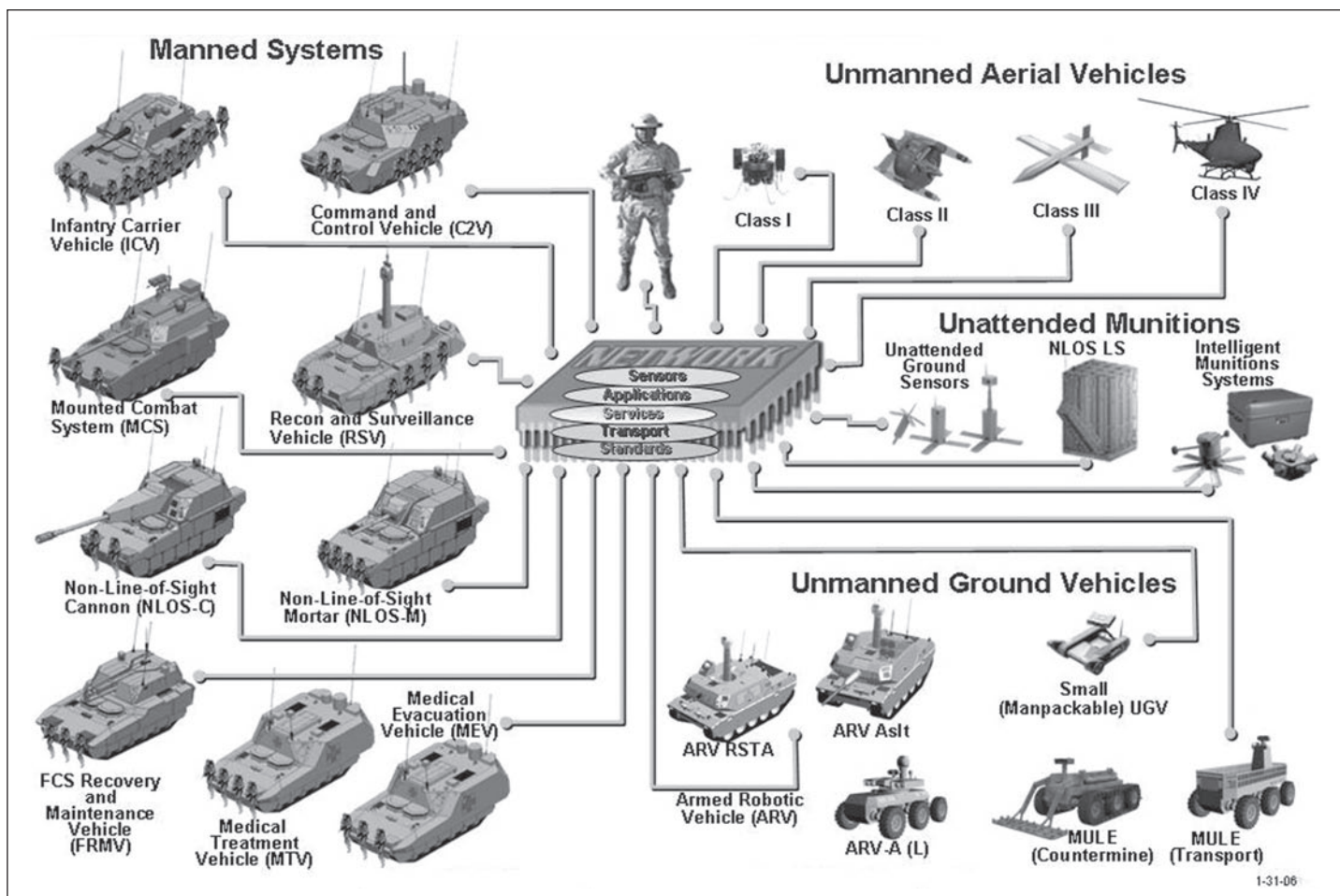
is expected to have achieved the level of knowledge it should have had in 2003. We believe it is at this point the program should be reviewed as to whether it has established enough of a solid business case to continue. While DOD concurred with the intent of our recommendations, it did not agree to limit its commitment to the FCS program or to do much beyond what it had already planned to do. This concerns us. As a result, we have also raised to Congress several matters for consideration to ensure that FCS has a sound business case before future funding commitments are made. We believe the actions we have recommended to DOD and the matters for consideration we have presented are necessary to improve the prospects for FCS success and to protect the government's ability to change course if the program does not progress as the Army plans.

Background

The FCS concept is part of a pervasive change to what the Army refers to as the Future Force. The Army is reorganizing its current forces into modular brigade combat teams, meaning troops can be deployed on different rotational cycles as a single team or as a cluster of teams. The Future Force is designed to transform the Army into a more rapidly deployable and responsive force and to enable the Army to move away from the large division-centric structure of the past. Each brigade combat team is expected to be highly survivable and the most lethal brigade-sized unit the Army has ever fielded. The Army expects FCS-equipped brigade combat teams to provide significant warfighting capabilities to DOD's overall joint military operations. The Army is implementing its transformation plans at a time when current U.S. ground forces are playing a critical role in the ongoing conflicts in Iraq and Afghanistan.

The FCS family of weapons includes 18 manned and unmanned ground vehicles, air vehicles, sensors, and munitions linked by an information network. These vehicles, weapons, and equipment will constitute the majority of the equipment needed for a brigade combat team. The Army plans to buy 15 brigades' worth of FCS equipment by 2025. See figure 1 for the various elements of the FCS program.

Figure 1: FCS's Core Systems



Source: U.S. Army.

If successful, the FCS system-of-systems concept will leverage individual capabilities of weapons and platforms and will facilitate interoperability and open system designs. This would be a significant improvement over the traditional approach of building superior individual weapons that must be retrofitted and netted together after the fact. This transformation, in terms of both operations and equipment, is under way with the full cooperation of the Army warfighter community. In fact, the development and acquisition of FCS is being accomplished using a uniquely collaborative relationship among the Army's developers, the participating contractors, and the warfighter community.

FCS Restructures the Program and Changes Contracting Approach

As a key element of its efforts to transform itself, the Army has recognized FCS from its outset as the greatest technology and integration challenge it has ever undertaken. In May 2003, DOD approved the FCS program to begin the system development and demonstration phase, a milestone that ideally marks the completion of technology development and the start of product development. However, FCS's entry into this phase was premature given the program had failed to satisfy basic tenets of DOD acquisition policy. We have reported that, as FCS started product development, it did not have mature technologies or adequately defined requirements.

Responding to direction from the Army Chief of Staff, the Army announced in July 2004 its plans to restructure the FCS program. The Army added 4 years to develop and mature the manned ground vehicles, added more demonstrations and experiments, and established an evaluation unit to demonstrate FCS capabilities. The restructuring reintroduced 4 systems that previously had been left unfunded, raising the total number of FCS-related systems to 18. The restructure also included plans to spin off mature FCS capabilities as they become available to current force units. With the restructuring, the FCS program now plans to achieve initial operational capability in fiscal year 2015 and full operational capability in fiscal year 2017. FCS low-rate production is expected to start in fiscal year 2012, and full-rate production in fiscal year 2016. The Army intends to continue FCS procurement through fiscal year 2025, eventually equipping 15 brigade combat teams.

The restructuring was not the only major modification to the FCS program. Because of congressional concerns that the Army's contracting approach incorporated insufficient safeguards to protect the government's interests, the Army is preparing a new contract that is to be completed and finalized in late March 2006 and is based on the Federal Acquisition Regulation, which governs acquisitions within the federal government. The new contract will incorporate standard Federal Acquisition Regulation clauses such as those relating to procurement integrity, Truth in Negotiations, and Cost Accounting Standards. Previously, the lead systems integrator had been performing FCS work for the Army under a contractual instrument called an "other transaction agreement" that was not subject to the Federal Acquisition Regulation. The other transaction agreement gave the Army considerable flexibility to negotiate the terms and conditions for contractors involved in FCS development. The Army's purpose for using such an agreement was to encourage innovation and to use its wide latitude in tailoring business, organizational, and technical relationships to achieve the program goals. In April 2005, the Army

decided to incorporate into its agreement the procurement integrity, Truth in Negotiations, and Cost Accounting Standards clauses from the regulation.

After Congress raised questions about the Army using an other transaction agreement for the development of a program as large and risky as FCS and about the Army's choice not to include standard Federal Acquisition Regulation clauses in the agreement, the Secretary of the Army directed that the other transaction agreement be converted to a Federal Acquisition Regulation-based contract. All of the work performed under the product development phase as of September 2005 will be accounted for under the prior other transaction agreement, and all work after September 2005 will be performed under the new contract. The Army expects the content of the program—its statement of work—will remain largely the same, and it does not expect the cost, schedule, and performance of the overall development effort to change materially.

Elements of a Business Case

We have frequently reported on the importance of using a solid, executable business case before committing resources to a new product development. In its simplest form, this is evidence that (1) the warfighter's needs are valid and can best be met with the chosen concept, and (2) the chosen concept can be developed and produced within existing resources—that is, proven technologies, design knowledge, adequate funding, and adequate time to deliver the product when needed.

At the heart of a business case is a knowledge-based approach to product development demonstrating high levels of knowledge before significant commitments are made. In essence, knowledge supplants risk over time. This building of knowledge can be described as three levels, or knowledge points, that should be attained over the course of a program:

- First, at program start, the customer's needs should match the developer's available resources—mature technologies, time, and funding. An indication of this match is the demonstrated maturity of the technologies needed to meet customer needs.
- Second, about midway through development, the product's design should be stable and demonstrate it is capable of meeting performance requirements. The critical design review takes place at that point of time because it generally signifies when the program is ready to start building production-representative prototypes.

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- Third, by the time of the production decision, the product must be shown to be producible within cost, schedule, and quality targets and have demonstrated its reliability, and the design must demonstrate that it performs as needed through realistic system-level testing.

The three knowledge points are related in that a delay in attaining one delays the points that follow. Thus, if the technologies needed to meet requirements are not mature, then design and production maturity will be delayed.

Objectives, Scope, and Methodology

To develop the information on the Future Combat System program's progress toward meeting established goals, the contribution of critical technologies and complementary systems, and the estimates of cost and affordability, we interviewed officials of the Office of the Under Secretary of Defense (Acquisition, Technology, and Logistics); the Army G-8; the Office of the Under Secretary of Defense (Comptroller); the Secretary of Defense's Cost Analysis Improvement Group; the Director of Operational Test and Evaluation; the Assistant Secretary of the Army (Acquisition, Logistics, and Technology); the Army's Training and Doctrine Command; Surface Deployment and Distribution Command; the Program Manager for the Future Combat System (Brigade Combat Team); the Future Combat System Lead Systems Integrator; and other contractors. We reviewed, among other documents, the Future Combat System's Operational Requirements Document, the Acquisition Strategy Report, the Baseline Cost Report, the Critical Technology Assessment and Technology Risk Mitigation Plans, and the Integrated Master Schedule. We attended or reviewed the results of the FCS System-of-Systems Functional Review, In-Process Reviews, Board of Directors Reviews, and multiple system demonstrations. In our assessment of the FCS, we used the knowledge-based acquisition practices drawn from our large body of past work as well as DOD's acquisition policy and the experiences of other programs. We conducted the above in response to the National Defense Authorization Act of Fiscal Year 2006, which requires GAO to annually report on the product development phase of the FCS acquisition. We performed our review from June 2005 to March 2006 in accordance with generally accepted government auditing standards.

Improved Business Case Is Needed for the FCS's Success

The FCS program started its product development phase with inadequate knowledge in several key areas. After almost 3 years and progress in key areas, the elements of a sound business case, namely firm requirements, mature technologies, a knowledge-based acquisition strategy, a realistic cost estimate, and sufficient funding, are not yet demonstrably present. Given that, an improved business case for the FCS program is essential to help ensure the program is successful in the long run. The importance of a business case is amplified by the fact that the program is developing 18 systems and a network under a single program office and lead system integrator in the same amount of time it would take to develop a single system.

While Progress Has Been Made, Requirements Still Remain Uncertain

The Army has made significant progress defining FCS's system-of-systems requirements, particularly when taking into account the daunting number of them involved—nearly 11,500 at this level. Yet system-level requirements are not yet stabilized and will continue to change, postponing the needed match between requirements and resources. Now the Army and its contractors are working to complete the definition of system-level requirements, and the challenge is in determining if those requirements are technically feasible and affordable. Army officials say it is almost certain some FCS system-level requirements will have to be modified, reduced, or eliminated; the only uncertainty is by how much. We have previously reported unstable requirements can lead to cost, schedule, and performance shortfalls. Once the Army gains a better understanding of the technical feasibility and affordability of the system-level requirements, trade-offs between the developer and the warfighter will have to be made, and the ripple effect of such trade-offs on key program goals will have to be reassessed. Army officials have told us it will be 2008 before the program reaches the point that it should have reached before it started in May 2003 in terms of stable requirements.

FCS Success Hinges on Numerous Undemonstrated Technologies and Complementary Programs

Development of concrete program requirements depends in large part on stable, fully mature technologies. Yet, according to the latest independent assessment, the Army has not fully matured any of the technologies critical to FCS's success.³ Some of FCS's critical technologies may not reach a high level of maturity until the final major phase of acquisition, the start of production. The Army considers a lower level of demonstration as acceptable maturity, but even against this standard, only about one-third of the technologies are mature. We have reported going forward into product development without demonstrating mature technologies increases the risk of cost growth and schedule delays throughout the life of the program. The Army is also facing challenges with several of the complementary programs considered essential for meeting FCS's requirements. Some are experiencing technology difficulties, and some have not been fully funded. These difficulties underscore the gap between requirements and available resources that must be closed if the FCS business case is to be executable.

Technology readiness levels (TRL) are measures pioneered by the National Aeronautics and Space Administration and adopted by DOD to determine whether technologies are sufficiently mature to be incorporated into a weapon system. Our prior work has found TRLs to be a valuable decision-making tool because they can presage the likely consequences of incorporating a technology at a given level of maturity into a product development. The maturity levels range from paper studies (level 1), to prototypes tested in a realistic environment (level 7), to an actual system proven in mission operations (level 9). Successful DOD programs have shown critical technologies should be mature to at least a TRL 7 before the start of product development.

³ Office of the Deputy Assistant Secretary of the Army for Research and Technology, *Technology Readiness Assessment Update*, April 2005.

Table 1: Number of FCS Critical Technologies Sorted by TRLs

| TRL | Critical technology assessment as of April 2003 | Critical technology assessment as of April 2005 |
|------------------|------------------------------------------------------------|------------------------------------------------------------|
| TRL 7 and higher | 1 | 0 |
| TRL 6 | 7 | 18 |
| TRL 5 and lower | 24 | 31 |
| Total | 32 | 49 |

Source: U.S. Army (data); GAO (analysis and presentation).

Note: The April 2003 assessment was organized into 31 technology areas, one of which had two different TRL ratings for separate technologies. For the April 2005 assessment, the original 31 technology areas were subdivided into 54 individual technologies. Five of the original technologies are no longer being tracked, leaving a total of 49.

Table 1 shows that in the latest independent FCS technology assessment, none of the critical technologies are at TRL 7, and only 18 of the 49 technologies currently rated have demonstrated TRL 6, defined as prototype demonstration in a relevant environment. None of the critical technologies may reach TRL 7 until the production decision in fiscal year 2012, according to Army officials. Projected dates for FCS technologies to reach TRL 6 have slipped significantly since the start of the program. In the 2003 technology assessment, 87 percent of FCS's critical technologies were projected to be mature to a TRL 6 by 2005. When the program was looked at again in April 2005, 31 percent of the technologies were expected to mature to a TRL 6 by 2005, and all technologies are not expected to be mature to that level until 2009.

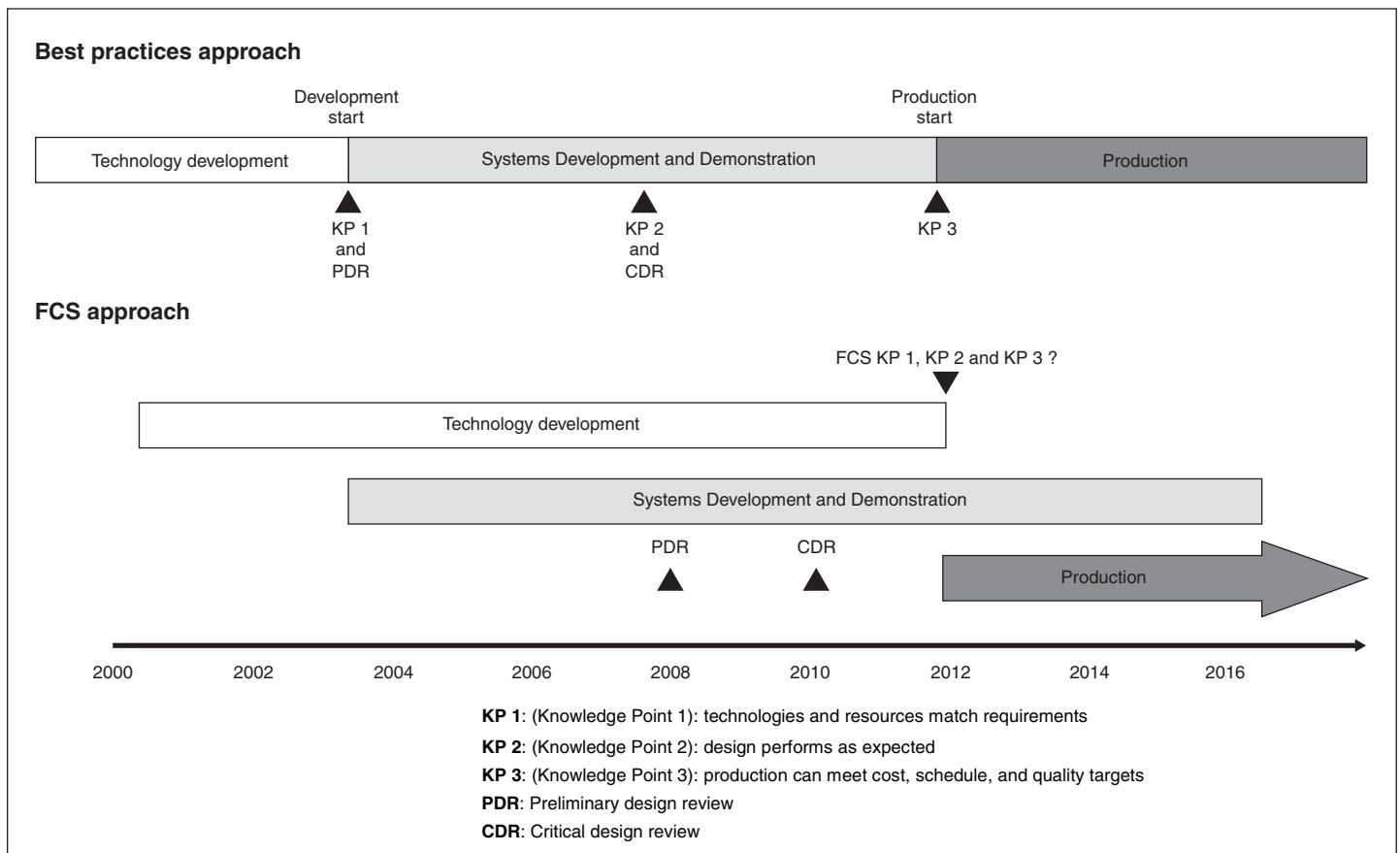
FCS Acquisition Strategy Will Demonstrate Design Maturity after Production Begins

The knowledge deficits for requirements and technologies have created enormous challenges for devising an acquisition strategy that can demonstrate the maturity of design and production processes. Several efforts within the FCS program are facing significant problems that may eventually involve reductions in promised capabilities and may lead to cost overruns and schedule delays. Even if requirements setting and technology maturity proceed without incident, FCS design and production maturity will still not be demonstrated until after the production decision is made. Production is the most expensive phase in which to resolve design or other problems.

The Army's acquisition strategy for FCS does not reflect a knowledge-based approach. Figure 2 shows how the Army's strategy for acquiring FCS involves concurrent development, design reviews occurring late, and

other issues out of alignment with the knowledge-based approach outlined in DOD policy.

Figure 2: FCS Acquisition Compared with Commercial Best Practices' Approach



Source: U.S. Army (data); GAO (analysis and presentation).

Ideally, the preliminary design review occurs at or near the start of product development. Review at this point can help reveal key technical and engineering challenges and can help determine if a mismatch exists between what the customer wants and what the product developer can deliver. An early preliminary design review is intended to help stabilize cost, schedule, and performance expectations. The critical design review ideally occurs midway into the product development phase. The critical design review should confirm the system design is stable enough to build production-representative prototypes for testing.

The FCS acquisition schedule indicates several key issues:

- The program did not have the basic knowledge needed for program start in 2003. While the preliminary design review normally occurs at or near the start of product development, the Army has scheduled it in fiscal year 2008, about 5 years after the start of product development.
- Instead of the sequential development of knowledge, major elements of the program are being conducted concurrently.
- The critical design review is scheduled in fiscal year 2010, just 2 years after the scheduled preliminary review and the planned start of detailed design. The timing of the design reviews is indicative of how late knowledge will be attained in the program, assuming all goes according to plan.
- The critical design review is also scheduled just 2 years before the initial FCS low-rate production decision in fiscal year 2012, leaving little time for product demonstration and correction of any issues identified at that time.

The FCS program is thus susceptible to late-cycle churn, which refers to the additional—and unanticipated—time, money, and effort that must be invested to overcome problems discovered late through testing.

FCS's Higher Costs May Result in Funding Challenge

The total cost for the FCS program, now estimated at \$160.7 billion (then-year dollars), has climbed 76 percent from the Army's first estimate. Because uncertainties remain regarding FCS's requirements and the Army faces significant challenges in technology and design maturity, we believe the Army's latest cost estimate still lacks a firm knowledge base. Furthermore, this latest estimate does not include complementary programs that are essential for FCS to perform as intended, or the necessary funding for spin-outs. The Army has taken some steps to help manage the growing cost of FCS, including establishing cost ceilings or targets for development and production. However, program officials told us that setting cost limits may result in accepting lower capabilities. As FCS's higher costs are recognized, it remains unclear whether the Army will have the ability to fully fund the planned annual procurement costs for the FCS current program of record. FCS affordability depends on the accuracy of the cost estimate, the overall level of development and procurement funding available to the Army, and the level of competing demands.

At the start of product development, FCS program officials estimated that the program would require about \$20 billion in then-year dollars for research, development, testing, and evaluation and about \$72 billion to procure the FCS systems to equip 15 brigade combat teams. At that time, program officials could only derive the cost estimate on the basis of what they knew then—requirements were still undefined and technologies were immature. The total FCS program is now expected to cost \$160.7 billion in then-year dollars, a 76 percent increase. Table 2 summarizes the growth of the FCS cost estimate.

Table 2: Comparison of Original Cost Estimate and Current Cost Estimate for FCS Program

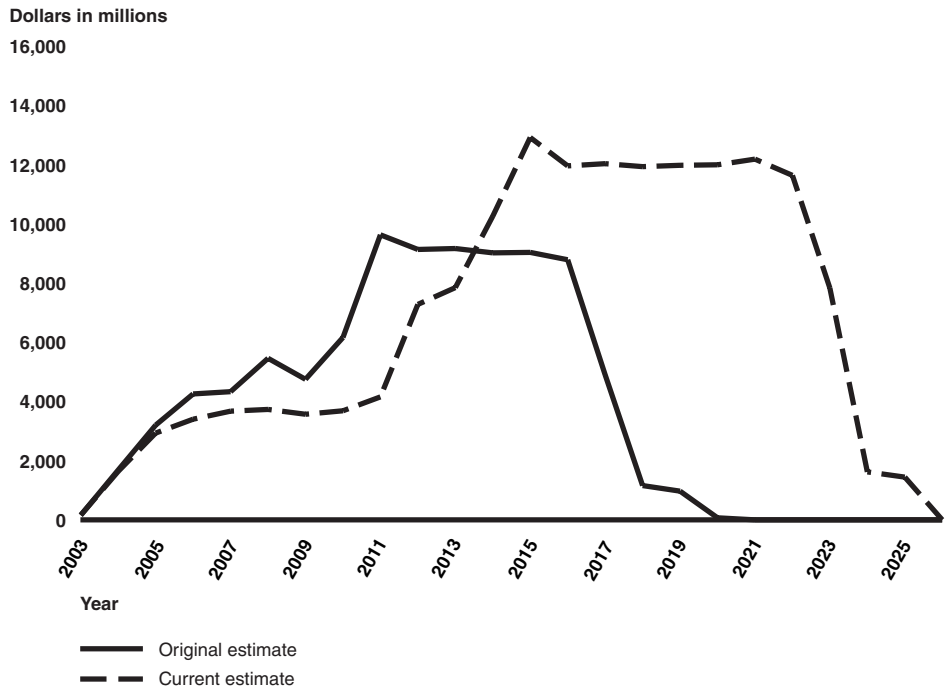
| (in billions of then-year dollars) | | | |
|------------------------------------------------|-------------------|---------------------------------|---------------------|
| | Original estimate | Revised estimate (as of 1/2006) | Percentage increase |
| Research, development, testing, and evaluation | \$19.6 | \$30.5 | 56% |
| Procurement | \$71.8 | \$130.2 | 81% |
| Total | \$91.4 | \$160.7 | 76% |

Source: Army (data); GAO (analysis and presentation).

According to the Army, the current cost estimate is more realistic, better informed, and based on a more reasonable schedule. The estimate accounts for the restructure of the FCS program and its increased scope, the 4-year extension to the product development schedule, the reintroduction of four systems that had been previously deferred, and the addition of a spin-out concept whereby mature FCS capabilities would be provided, as they become available, to current Army forces. The estimate also reflects a rate of production reduced from an average of 2 brigade combat teams per year to an average of 1.5 brigades per year. Instead of completing all 15 brigades by 2020, the Army would complete production in 2025. This cost estimate has also benefited from progress made in defining system-of-systems requirements.

Figure 3 compares the funding profiles for the original program and for the latest restructured program.

Figure 3: Comparison of Original Cost Estimate and Current Cost Estimate for FCS Program between Fiscal Years 2003 and 2026



Source: U.S. Army (data); GAO (analysis and presentation).

The current funding profile is lower than the original through fiscal year 2013, but is substantially higher than the original after fiscal year 2013. It still calls for making substantial investments before key knowledge has been demonstrated. Stretching out FCS development by 4 years freed up about \$9 billion in funding through fiscal year 2011 for allocation to other Army initiatives. Originally, FCS annual funding was not to exceed \$10 billion in any 1 year. Now, the cost estimate is expected to exceed \$10 billion in each of 9 years. While it is a more accurate reflection of program costs than the original estimate, the latest estimate is still based on a low level of knowledge about whether FCS will work as intended. The cost estimate has not been independently validated, as called for by DOD's acquisition policy. The Cost Analysis Improvement Group will not release its updated independent estimate until spring 2006, after the planned Defense Acquisition Board review of the FCS program.

The latest cost estimate does not include all the costs that will be needed to field FCS capabilities. For instance,

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- Costs for the 52 essential complementary programs are separate, and some of those costs could be substantial. For example, the costs of the Joint Tactical Radio System Clusters 1 and 5 programs were expected to be about \$32.6 billion (then-year dollars).⁴
 - Some complementary programs, such as the Mid-Range Munition and Javelin Block II, are currently not funded for their full development. These and other unfunded programs would have to compete for already tight funding.
 - Procurement of the spin-outs from the FCS program to current Army forces is not yet entirely funded. Procuring the FCS items expected to be spun out to current forces is expected to cost about \$19 billion, and the needed installation kits may add \$4 billion. Adding these items brings the total required FCS investment to the \$200 billion range.

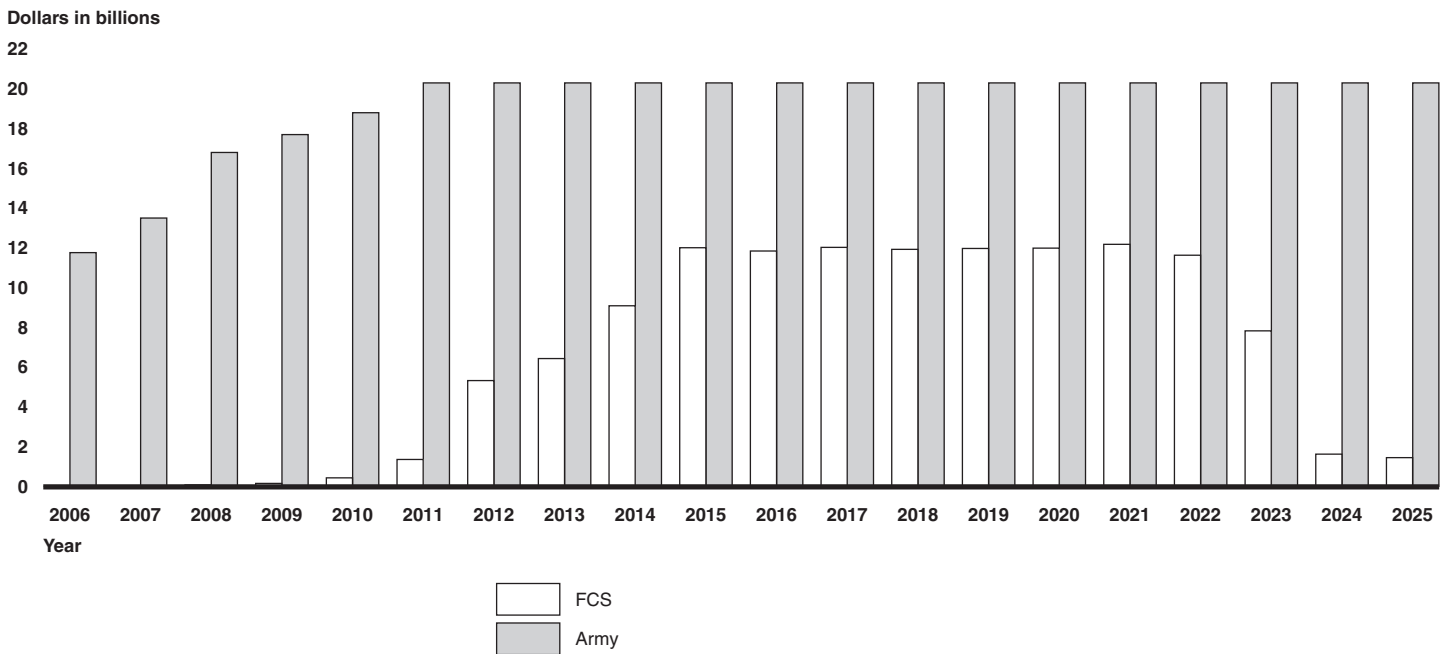
Through fiscal year 2006, the Army will have budgeted over \$8 billion for FCS development. Through fiscal year 2008, when the preliminary design review is held, the amount budgeted for FCS will total over \$15 billion. By the time the critical design review is held in 2010, about \$22 billion will have been budgeted. By the time of the production decision in 2012, about \$27 billion will have been budgeted.

The affordability of the FCS program depends on several key assumptions. First, the program must proceed without exceeding its currently projected costs. Second, the Army's annual procurement budget—not including funds specifically allocated for the modularity initiative—is expected to grow from about \$11 billion in fiscal year 2006 to at least \$20 billion by fiscal year 2011. Even if this optimistic projection comes to pass, FCS annual procurement costs will dominate the Army procurement funding. If the Army budget remains at fiscal year 2011 levels, FCS procurement will represent about 60 to 70 percent of Army procurement from fiscal years 2014 to 2022. With the remainder, the Army will have to address current force upgrades, including spin-outs from FCS, the procurement of FCS complementary programs, aviation procurement, trucks, ammunition, and other equipment. Further, FCS will have to compete for funding with other Army "big-ticket" items, such as missile defense systems and the future heavy lift helicopter.

⁴ The ongoing operational assessment of the Joint Tactical Radio System functionality could result in a program restructure, which would have an impact on the program's costs.

Figure 4 compares the projected FCS budget with the funds the Army projects for its total procurement budget.

Figure 4: Comparison of FCS Budget with Total Army Procurement Budget



Source: U.S. Army (data); GAO (analysis and presentation).

The large annual procurement costs for FCS are expected to begin in fiscal year 2012, which is beyond the current Future Years Defense Plan period (fiscal years 2006-2011). This situation is typically called a funding bow wave. The term “bow wave” is used to describe a requirement for more funds just beyond the years covered in the current defense plan that are subject to funding constraints. As it prepares the next defense plan, the Army will face the challenge of allocating sufficient funding to meet the increasing needs for FCS procurement in fiscal years 2012 and 2013. According to an Army official, if all the needed funding cannot be identified, the Army will consider reducing the FCS procurement rate or delaying or reducing items to be spun out to current Army forces. However, reducing the procurement rate would increase the FCS unit costs and extend the time needed to deploy FCS-equipped brigade combat teams.

Recent FCS Recommendations and Matters for Congressional Consideration

In our most recent report on the FCS, we made specific recommendations to the Secretary of Defense, with the intent that DOD limit its commitment to the FCS until it demonstrates a solid business case. DOD, in its response to our draft report, concurred with the intent of the recommendations but did not agree to limit its commitment to the FCS program or to take any action beyond what it had already planned to do. Consequently, we added several matters for congressional consideration in order to highlight key issues and actions that Congress may want to take.

Recommendations to DOD

In our March report we made several specific recommendations to the Secretary of Defense, which are intended to limit DOD's commitment to the FCS until a sound business case that is consistent with DOD acquisition policy and best practices can be clearly demonstrated.

Specifically, we recommended that the Secretary of Defense lay the groundwork for the Army's development of a sound FCS business case by tasking the spring 2006 Defense Acquisition Board to do the following:

- Reevaluate the FCS business case—including requirements, technologies, complementary programs, acquisition strategy, cost, and funding availability—in light of its own acquisition policies.
- If the business case for FCS is found not to be executable, determine whether investments in FCS design- and production-related activities should be curbed until system-level requirements are firm and technologies are mature.
- If the deficiencies in the FCS business case are judged to be recoverable, establish the incremental markers that are needed to demonstrate that FCS is proceeding on a knowledge-based approach and to hold the Army accountable, through periodic reporting or other means, for achieving those markers.

We also recommended that the Secretary of Defense reassess the FCS cost estimate and funding availability based on the independent cost estimate and any program changes to improve its business case.

Finally, we recommended that the Secretary of Defense establish a milestone review by the Defense Acquisition Board following the Army's preliminary design review scheduled for 2008. This should be a go/no-go review of the FCS program that is based on (1) the program's ability to

demonstrate whether it is meeting the knowledge markers outlined above at times consistent with DOD policy and best practices and (2) whether the funds can still be made available to afford its costs.

DOD Comments on Our Report and Our Evaluation

DOD concurred with the intent of our recommendations but did not agree to limit its commitment to the FCS program or to take any action beyond what it had already planned to do. DOD stated it is committed to the Army's transformation, and that effort, in particular the FCS program, requires a disciplined, yet agile, acquisition construct. DOD's response to our draft report did not specifically address our findings on the FCS program's lack of a sound business case. DOD added that the Defense Acquisition Executive has determined that the FCS program is based on a viable acquisition strategy and that it would reevaluate the FCS acquisition strategy and reassess FCS cost estimates and funding in the spring 2006 Defense Acquisition Board review. DOD also noted a Defense Acquisition Board review would be held for the time frame (2008) of the FCS preliminary design review, but it refrained from committing to making a milestone decision review.

Regarding a commitment to a milestone review in 2008, we noted that the FCS was allowed to proceed into Systems Development and Demonstration prematurely, while DOD had directed a full milestone review update be held in November 2004. However, the review has not yet occurred, and it now appears it will not occur. Thus, there is no commitment by DOD to review the FCS business case (including all elements in addition to the acquisition strategy), culminating in a go/no-go decision in 2008 based on the preliminary design review. The increased responsibility of making a declarative decision adds a higher level of discipline and accountability than a review implies. We maintain our position that such a decision is warranted.

Matters for Congressional Consideration

Based on DOD's response to our report, it did not appear that DOD planned to assess the FCS business case against best practices or its own policies. Nor did DOD agree to hold a go/no-go milestone review in 2008 based on the preliminary design review. Congress will likely be asked to approve fiscal years 2008 and 2009 funding requests before the FCS business case is adequately demonstrated. In light of DOD's response, Congress should consider directing the Secretary of Defense to:

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- report on the results of the May 2006 Defense Acquisition Board's review of the FCS program business case in the areas of requirements, technologies, acquisition strategy, cost, and funding, and
 - direct DOD to conduct and report the results of a milestone review in 2008, following the preliminary design review, that will be a go/no-go review of the FCS program based on its demonstration of a sound business case.

Congress should also consider restricting annual appropriations for fiscal years 2008 and 2009 for the FCS program until definitive progress in establishing a sound business case is demonstrated in terms of firm requirements, mature technologies, a knowledge-based acquisition strategy, a realistic cost estimate, and sufficient funding. Most important, the Army must provide sufficient evidence FCS will work.

Mr. Chairman, this concludes my prepared statement. I would be happy to answer any questions you or members of the subcommittee may have.

Contacts and Staff Acknowledgments

For future questions about this statement, please contact me at (202) 512-4841. Individuals making key contributions to this statement include Robert L. Ackley, Noah B. Bleicher, Lily J. Chin, Randolph E. DeLeon, Marcus C. Ferguson, William R. Graveline, Michael J. Hesse, Guisseli Reyes, John P. Swain, and Carrie R. Wilson.

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